Polyurethane Sponge Facilitating Highly Dispersed 
TiO$_2$ Nanoparticles on Reduced Graphene Oxide 
Sheets for Enhanced Photoelectro-Oxidation of 
Ethanol

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Fig. S1 (a-b) Adsorption of GO into the bare sponge template to prepare GO-sponge. (c) Drying process for ethanol removal. (d-f) Hydrothermal treatment process for growth of TiO$_2$ and the as-obtained GO-TiO$_2$-sponge. (g-h) Annealing process of GO-TiO$_2$-sponge to produce S-RGO-TiO$_2$.

Fig. S2 SEM of (a) bare polyurethane sponge, (b) GO-sponge and (c) GO-TiO$_2$-sponge before annealing treatment for polyurethane sponge removal.
**Fig. S3** Photos of (a) bare polyurethane sponge, (b) S-RGO and (c) S-RGO-TiO$_2$. S-RGO and S-RGO-TiO$_2$ obtained after annealing at 450 °C in the mixture of argon/hydrogen for 2 h.

**Fig. S4** TEM images of (a)(b) bare TiO$_2$ and (c)(d) RGO-TiO$_2$. Both bare TiO$_2$ and RGO-TiO$_2$ were obtained after 5 h hydrothermal treatment and 2 h annealing treatment. Scale bar: 200 nm.
**Fig. S5** XRD of TiO$_2$, RGO-TiO$_2$ and S-RGO-TiO$_2$.

**Fig. S6** Nitrogen adsorption-desorption isotherm of RGO-TiO$_2$ and S-GRO-TiO$_2$. The insert shows their pore-size distributions.
Fig. S7 TGA of RGO-TiO$_2$ and S-RGO-TiO$_2$.

Fig. S8 The photocurrent responses of TiO$_2$, RGO-TiO$_2$, and S-RGO-TiO$_2$ for each switch-on/off event with a bias voltage of 0.25 V in 0.5 M Na$_2$SO$_4$ and 0.1 M ethanol electrolyte solution under visible light irradiation.